

CLAIMS

1. A method for manufacturing a semiconductor device comprising the steps of:

5 forming source and drain electrodes over a substrate having an insulating surface,

forming a semiconductor film containing an organic material over the source and drain electrodes ,

forming a mask over the semiconductor film,

10 etching the semiconductor film using the mask to form a semiconductor layer, and

forming a gate electrode over the mask with the mask remaining over the semiconductor layer.

15 2 . A method for manufacturing a semiconductor device including a first element and a second element , comprising the steps of:

20 forming a gate electrode for each of the first element and the second element over a substrate having an insulating surface,

forming a gate insulating film over the gate electrode,

forming source and drain electrodes for each of the first element and the second element over the gate insulating film,

25 forming a first semiconductor film containing a first organic material over the source and drain electrodes of the

first element,

forming a first mask over the first semiconductor film,

etching the first semiconductor film using the first mask

to form a semiconductor layer of the first element ,

5 forming a second semiconductor film containing a second organic material over the source and drain electrodes of the second element with the first mask remaining over the semiconductor layer of the first element,

forming a second mask over the second semiconductor film,

10 etching the second semiconductor film using the second mask to form a semiconductor layer of the second element , and

forming the semiconductor device with the first mask remaining over the semiconductor layer of the first element and the second mask over the semiconductor layer of the second

15 element.

3 . A method for manufacturing a semiconductor device including a first element and a second element , comprising the steps of:

20 forming a gate electrode of the first element over a substrate having an insulating surface,

forming a gate insulating film of the first element over the gate electrode of the first element,

25 forming source and drain electrodes of the first element over the gate insulating film of the first element.

forming a first semiconductor film containing a first organic material over the source and drain electrodes of the first element,

5 forming a first mask over the first semiconductor film,
etching the first semiconductor film using the first mask to form a semiconductor layer of the first element,

forming a gate insulating film of the second element over the drain electrode of the first element with the first mask remaining over the semiconductor layer of the first element,

10 forming source and drain electrodes of the second element over the gate insulating film of the second element,

forming a second semiconductor film containing a second organic material over the source and drain electrodes of the second element ,

15 forming a second mask over the second semiconductor film,
etching the second semiconductor film using the second mask to form a semiconductor layer of the second element, and
forming an insulating film over the semiconductor layer of the second element with the second mask remaining over the
20 semiconductor layer of the second element,

wherein the drain electrode of the first element is made of the same layer and connected to a gate electrode of the second element .

25 4 . The method for manufacturing the semiconductor device

according to Claim 1, wherein the mask is formed by a droplet discharge method.

5 . The method for manufacturing the semiconductor device
5 according to Claim 1, the method further comprising:

forming an inorganic film over the semiconductor film
after forming the semiconductor film, and

forming a barrier layer formed of the inorganic film by
etching the inorganic film using the mask, and

10 wherein the mask is formed over the inorganic film, and
wherein the semiconductor layer is formed by etching the
semiconductor film using the mask after forming the barrier
layer .

15 6 . The method for manufacturing the semiconductor device
according to Claim 2, wherein the first and second elements
are included in a CMOS circuit.

7 . The method for manufacturing the semiconductor device
20 according to Claim 3, wherein one of the source and drain
electrodes of the second element is connected to an EL element,
and the first element , the second element , and the EL element
are included in the same pixel.

25 8 . The method for manufacturing the semiconductor device

according to Claim 2 or Claim 3,

the first mask and the second mask are formed by a droplet discharge method.

5 9. The method for manufacturing the semiconductor device according to Claim 2 or Claim 3, the method further comprising:

forming a first inorganic film over the first semiconductor film,

10 forming a first barrier layer by etching the first inorganic film using the first mask,

forming a second inorganic film over the second semiconductor film, and

forming a second barrier layer by etching the second inorganic film using the second mask,

15 wherein the first mask is formed over the first inorganic film,

wherein the second mask is formed over the second inorganic film,

20 wherein the semiconductor layer of the first element is formed by etching the first semiconductor film using the first mask after forming the first barrier layer, and

wherein the semiconductor layer of the second element is formed by etching the second semiconductor film using the second mask after forming the second barrier layer.

10. The method for manufacturing the semiconductor device according to Claim 2 or Claim 3, wherein all the portion of the first element and the second element are formed from organic compound materials.

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11. The method for manufacturing the semiconductor device according to any one of Claims 1 to 3, wherein a barrier layer is formed so as to be in contact with the substrate.